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10/580,671	05/26/2006	Christopher Stuart Cutler	42706-2400	5735

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EXAMINER

GREEN, YARA B

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2884

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/580,671	Applicant(s) CUTLER ET AL.	
	Examiner YARA B. GREEN	Art Unit 2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 February 2008, 27 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,5-20,22-44 and 46-50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 22-44, 48 and 49 is/are allowed.
- 6) ☒ Claim(s) 1,3,5,7-20,46-47 is/are rejected.
- 7) ☒ Claim(s) 6,50 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/7/2008</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to Applicant's Amendment filed February 27, 2008. Claims 1, 3, 5, 20, 22-25, 46, and 49 have been amended. Claim 51 has been added and subsequently cancelled. Claims 2, 4, 21, and 45 have been cancelled. Currently, claims 1, 3, 5-20, 22-44, and 46-50 are pending.

Response to Amendment

1. The submission of the IDS and the necessary translations of foreign references on February 7, 2008 successfully overcomes the objections set forth in paragraphs 1 and 2 of the previous Office Action.
2. The amendments to claims 20 and 44 successfully overcome the objections set forth in paragraph 3 of the previous Office Action.
3. The cancellation of claims 21 and 45 renders the objections set forth in paragraph 3 of the previous Office Action moot and is therefore withdrawn.
4. The amendments to claims 1 and 22 successfully overcome the objections set forth in paragraph 4 of the previous Office Action.
5. The amendments to claims 23-25 successfully overcomes the objections set forth in paragraph 5 of the previous Office Action.

6. The amendment to claim 1 successfully overcomes the rejection under 35 U.S.C. 112, second paragraph as set forth in paragraph 7 of the previous Office Action.

Response to Arguments

7. Applicant's arguments, see page 12, paragraph 4, filed February 7, 2008, with respect to the rejection(s) of claim(s) 1, 3, and 5-20 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Herman et al. (US Patent No. 5,495,747) and Wong (US Patent No. 5,502,308).

Information Disclosure Statement

8. The information disclosure statement (IDS) submitted on February 7, 2008 was filed after the mailing date of the Non-Final Rejection on November 15, 2007. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Objections

9. Claim 50 objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative. See MPEP § 608.01(n). Accordingly, the claim 50 has not been further treated on the merits.

Claim Rejections - 35 USC § 112

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10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claim 10 recites the limitation “the infrared generating means”. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. **Claims 1, 3, 5, 7, 9-12, 17, 18, and 46** are rejected under 35 U.S.C. 103(a) as being unpatentable over Diekmann et al. (US Patent No. 6,989, 549; filed May 5, 2003) in view of Herman et al. (US Patent No. 5,495,747; published March 5, 1996) and Wong (US Patent No. 5,502,308; published March 26, 1996).

Re **claims 1 and 3**, Diekmann et al. teach a gas sensor comprising a cavity for containing gas (col. 3, lines 62-67); means for generating radiation **6** which transmitted through the cavity and including one more wavelengths which is absorbed in use by a gas to be detected (col. 1, lines 55-60); and a detector **23,24** for detecting radiation which has passed through the cavity the detector having a first surface area which is visible to the interior of the cavity (col. 3, lines 52-60).

Diekmann et al. further teach wherein the radiation generating means **6** and the radiation detectors **23, 24** are protected b a cover **5** that has one or more apertures (col. 4, lines 40-47). The sizes of the apertures of cover 5 are not disclosed with regards to whether they permit the radiation

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sources and detector to extend through them. It is taught that the apertures may optionally be sealed with windows (col. 4, lines 44-48). The option of leaving the apertures uncovered in conjunction with Figure 1 lends one of ordinary skill in the art that it is within the scope of the invention to fabricate apertures in the cover **5** in manner through which the radiation detectors and source may extend in a close fitting relationship. In a similar field of endeavour, Herman et al. teach a gas sensor in which radiation detector elements extend through apertures in a given cover (col. 6, lines 30-41) and further comprises an electronic housing coupled to the cover to assist providing a surface of the cavity and direct flow of the gas past the detectors and radiation source (col. 6, lines 30-41). One of ordinary skill in the art would have been motivated to implement the electronics housing of Herman et al. in order to provide adequate protection as well as direction of gas flow in the apparatus of Diekmann et al.

Diekmann et al. are silent with regards to the detecting and radiation elements being disposed on a printed circuit. However, it is well known to mount circuitry elements such as detectors and radiation sources on a printed circuit board and therefore would have been obvious to one of ordinary skill in the art.

Both Diekmann et al. are silent with respect to the cover **5** material and therefore allows for that which is well known in the art. In a similar field of endeavour, Wong teaches implementing a plastic member in conjunction with the radiation source and detectors (serving as a cover) in order to provide a cap that reduces and seals the free volume within the cavity (col. 4, lines 35-42). As the hardness or resiliency of the plastic material was not specified, one of ordinary skill in the art would not be precluded from choosing a type of plastic which possesses a desired degree of resiliency. One of ordinary skill in the art would have been motivated to use the material of Wong in the cover of Diekmann et al. since it has been held to be within the general skill of worker in the art to select a

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known material on the basis of its suitability for the intended use as a matter of obvious design choice (*In Re Lesbin* 125 USPQ 416).

Re **claim 5**, Diekmann et al., as modified by Herman et al. and Wong, teach the limitations of claim 1, as mentioned above. Herman et al. is silent as to the manner in which the cover and electronics housing may be mounted. It would have been obvious to one of ordinary skill in the art to maintain an alignment between these elements, as market pressure would require the elements to remain intact in order to perform correctly. This alignment can be maintained by those methods well known in the art (threaded/screw mechanism, adhesive, interengaging key locks, welding, flanges, etc).

Re **claim 7**, Diekmann et al., as modified by Herman et al. and Wong, teach the limitations of claim 1, as mentioned above. Diekmann et al. further teach where in the entire visible surface area of the detector **23, 24** is illuminated with substantially unfocussed radiation (col. 4, lines 30-39).

Re **claim 9**, Diekmann et al., as modified by Herman et al. and Wong, teach the limitations of claim 1, as mentioned above. Diekmann et al. further teach wherein the radiation generating means **6** generates infrared radiation (col. 1, lines 6-9).

Re **claim 10**, Diekmann et al., as modified by Herman et al. and Wong, teach the limitations of claim 1, as mentioned above. Although Diekmann et al. is silent with the details of the of the infrared radiation sources, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a heating element as the infrared source since it has been held to be within the general skill of the worker to select an infrared radiation source on the basis of its suitability for the intended use.

Re **claim 11**, Diekmann et al., as modified by Herman et al. and Wong, teach the limitations of claim 1, as mentioned above. Diekmann et al. further teach a sensor according to claim 1, further

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comprising one or more additional radiation detectors **23, 24** each detector being adapted to sense radiation centered on a respective, different wavelength (col. 3, lines 52-61).

Re **claim 12**, Diekmann et al., as modified by Herman et al. and Wong, teach the limitations of claim 1, as mentioned above. As taught above in claim 1, the upper wall of the electronics housing of Herman et al. defines the lower wall of the cavity of the gas sensor. The apertures present in the electronics housing of Herman et al. (elements 200, 190, 180 in Figure 2c) form a window on the lower wall of the cavity to allow radiation to pass therethrough to the one or a respective detector.

Re **claim 17**, Diekmann et al., as modified by Herman et al. and Wong, teach the limitations of claim 1. Diekmann et al. further disclose wherein the cavity is tubular, for example cylindrical, and has substantially planar end walls (col. 4, lines 65-68, Figure 1).

Re **claim 18**, Diekmann et al., as modified by Herman et al. and Wong, teach the limitations of claim 1. Diekmann et al. further disclose wherein the means for generating radiation and the detector are located within an outer housing **2** having at least one aperture **1** to allow gas to enter (col. 4, lines 54-59). Herman et al. also teach an outer housing containing the radiation generating means and detector in which the outer housing has at least one aperture to allow gas to enter (col. 5, lines 23-30).

Re **claim 46**, the method required by the limitations recites essentially the same limitations required by the structures in claims 1, 2, 5, 12, 17, and 18 and are hereby rejected similarly.

14. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over Diekmann et al. (US Patent No. 6,989, 549; filed May 5, 2003) in view of Herman et al. (US Patent No. 5,495,747; published March 5, 1996) and Wong (US Patent No. 5,502,308; published March 26, 1996), as

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applied to claim 1, and further in view of Wong (US Patent No. 5,721,430; published February 24, 1998; hereafter Wong-2).

Diekmann et al., as modified by Herman et al. and Wong, teach the limitations of claim 1, as mentioned above. Diekmann et al. are silent with regards to the relationship of the signal-to-noise to the surface areas of the detector and cavity walls. In a similar field of endeavour, Wong-2 teach that is well known that increasing the surface area of the detector relative to the surface area of the cavity walls increases the signal to noise ratio detected by the detector (col. 11, lines 11-40). One of ordinary skill in the art would have recognized the relationship of the signal-to-noise and the surface areas of the cavity walls and detector, as disclosed by Wong-2, in the apparatus of Diekmann et al., as modified by Herman et al. and Wong.

15. **Claims 13 – 15** are rejected under 35 U.S.C. 103(a) as being unpatentable Diekmann et al. (US Patent No. 6,989, 549; filed May 5, 2003) in view of Herman et al. (US Patent No. 5,495,747; published March 5, 1996) and Wong (US Patent No. 5,502,308; published March 26, 1996), as applied to claim 1, and further in view of Sun et al. (US Patent No. 6,469,303; published October 22, 2002).

Diekmann et al., as modified by Herman et al. and Wong, teach the limitations of claim 1, as mentioned above. Diekmann et al. further disclose (col. 4, lines 65-67) the cavity walls to be highly reflective but does not require the application of a coating. In the same field of endeavour, Sun et al. teach applying a gold coating to the cavity walls in order to increase reflectance, where it is well known in the art that gold has a reflectivity greater than 95% in the infrared band. (col. 4, lines 1-7). It would have been obvious to one of ordinary skill in the art to coat the majority of the walls to

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ensure high signal which would involve coating the largest percentage (i.e. more than 90%) of the walls as is feasible without inhibiting the performance of the detector.

16. **Claim 16** is rejected under 35 U.S.C. 103(a) as being unpatentable over Dickmann et al. (US Patent No. 6,989, 549; filed May 5, 2003) in view of Herman et al. (US Patent No. 5,495,747; published March 5, 1996) and Wong (US Patent No. 5,502,308; published March 26, 1996), as applied to claim 1, and further in view of Rogalski et al. ("Infrared devices and techniques", published 2002)

Dickmann et al., as modified by Herman et al. and Wong, teach the limitations of claim 1, as mentioned above, but do not applying a transparent coating to the metallic cavity walls (col. 26, lines 1-5). In a similar field of endeavour, Rogalski et al. teach that the mirror optics (i.e. the reflective cylindrical walls, as can be used in gas sensors (sect. 7.0), must be coated with protective coating in order to prevent them from tarnishing (sect. 2.7). One of ordinary skill in the art would have been motivated to coat the metallic walls of the cavity with a transparent coating so not to interfere with the reflectivity of the metal, as disclosed by Rodalski et al., in the apparatus of Dickmann et al, as modified by Herman et al. and Wong, in order to preserve the integrity of the optics.

17. **Claims 19-20 and 47** are rejected under 35 U.S.C. 103(a) as being unpatentable Dickmann et al. (US Patent No. 6,989, 549; filed May 5, 2003) in view of Herman et al. (US Patent No. 5,495,747; published March 5, 1996) and Wong (US Patent No. 5,502,308; published March 26, 1996), as applied to claims 1 and 46, respectively, and further in view of Starta et al. (US PreGrant Pub. 2004/0209507; filed May 31, 2002).

Re claims **19-20**, Diekmann et al., as modified by Herman et al. and Wong, teach the limitations of claim 18, as mentioned above, but do not teach the use of a flame arrestor. Herman et al. do recognize the use of a frit to prevent flashback (col. 4, lines 36-38). In a similar field of endeavour, Starta et al. teach wherein the outer housing comprises a flame arrestor (para. 0041) wherein the flame arrestor is secured to an outer surface of the a housing having at least one aperture, the housing defining a wall of the cavity, by a flange that overlaps the flamer arrestor, whereby the cavity housing is assembled in the outer housing, the flange defines the thickness of a gas chamber communicating with the apertures in the outer and cavity housing (figure 5b, see structures and element 260). One of ordinary skill in the art would have been motivated to implement the flame arrestor of Starta et al. in the apparatus of Diekmann et al, as modified by Herman et al. and Wong, in order to prevent and control ignition of the measured gas.

Re **claim 47**, Diekmann et al., as modified by Herman et al. and Wong, teach the limitations of claim 46, as mentioned above. Diekmann et al. is silent with regards to the application of a potting compound. In a similar field of endeavour of gas sensor, Starta et al. teach applying a potting mix to an assembled gas sensor in order to insulate and protect the circuit board present in the sensor housing. One of ordinary skill in the art would have been motivated to implement the potting mix of Starta et al. in the apparatus of Diekmann et al., as modified by Herman et al. and Wong, in order to provide chemical resistance to the circuit board and thereby protecting it.

Allowable Subject Matter

18. As mentioned in the previous Office Action, claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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19. As mentioned in the previous Office Action, claims 22-44, and 48-49 are allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YARA B. GREEN whose telephone number is (571)270-3035. The examiner can normally be reached on Monday - Thursday, 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/David P. Porta/

Supervisory Patent Examiner, Art Unit 2884